any meaningful difference between these two groups with the view of lesson grade while the related grade of foot in final exam of item group, was higher than the grade of speculation group and indeed it was higher than the whole students grade.(P<0/05).**Discussion and conclusion:**Anatomy is a based science of figure and image and its file in human memory is more imaginary and not verbal. So, instead of lecture and text of lesson passages, maybe it is better to use accurately and exactly from image and tridimensional models based on anatomy training.In the other hand, although anatomy is a pre organizer of lessons, but it is a pre organizer of meaningful verbal and therefore in its training, we can suggest the using of pre organizers.

**Key words:**Image pre organizers, Anatomy training, Learning, Medical students.

## Advances in Bulge region Stem Cells of the Human, Mouse and Rat

Najafzade N

**Anatomy Department, Iran University of Medical Scinces, Tehran, Iran.**

Stem cells have the unique capacity to self-renewal and to differentiate into the cell lineages that constitute their tissue of origin. Within the tissue, they often reside in niches that provide a specialized environment thought to regulate their proliferation and differentiation. Hair follicle is composed of concentric rings of an external outer root sheath attached to the basal lamina and contiguous with epidermis, channel and finally the hair shaft. The hair is growth from the bulb of the follicle. In catagen period, hair growths cease and lower half of each follicle degenerate. After arrest period (telogen) the lower follicle growth and produce a new hair. Studies in Human, rat and mouse suggested that, stem cells reside in the bulge when cultured in vitro. Bulge keratinocytes yeild larger colonies, than those from other skin sites. Finally they can change to epidermis, hair follicle and sebaceous glands. Bulge stem cell can express keratin15, keratin1, integrin, nestin. Hair follicle stem cells have slow cycling and

label retaining properties, so they grown in culture mediums that have epidermal growth factor and collagen coated flasks or in feeder cell layer. They are multipotent, able to differentiate to Schwann cells, astrocytes, oligodendrocytes and neurons.

**Key words:** Bulge stem cells, hair follicle

## Dietary supplement for multiple sclerosis (Review)

**Miri SH , Mousavizadeh K**

**Cellular and Molecular Research Center , Iran University of Medical Sciences,Tehran,Iran.**

Multiple sclerosis (MS) is a chronic inflammatory disease of the central nervous system (CNS) , which is the most common disabling neurological disease among young adults .

MS is caused by an inflammatory response with unknown cause and penetration of T lymphocytes and monocytes into blood brain barrier , and further attack on myelin basic protein . Accumulating data indicate that oxidative stress (OS) plays a major role in the pathogenesis of MS . Reactive oxygen species (ROS) ,leading to OS , generated in excess primarily by macrophages , have been implicated as mediators of demyelination and axonal damage , resulting in neurological deficits . In addition , polyunsaturated fatty acids (PUFA) and antioxidant deficiencies along with weakened cellular antioxidant defense system in the CNS in MS , and its vulnerability to ROS effects may increase damage . Living cells have a limited capacity to nullify the activity of these oxidative free radicals, but it is believed that the ingestion of exogenous antioxidants can improve the protection of vital cellular components and thus their physiological function. Such exogenous antioxidants are commonly obtained from food and include vitamins C and E, beta-carotene, and a variety of phenolic compounds including flavonoids. Flavonoids are compounds occurring naturally in food , which scavenge oxygene radicals and have anti-inflammatory